

A-2
1 CLAIMS: Add A2 /

2 CANCEL

3 CLAIMS. 1 - 55

4 CANCELLED 1. [A semiconductor processor for processing wafers or other

5 semiconductor articles, comprising:

6 an enclosure for providing a substantially enclosed work space;

7 an interface port in said enclosure through which wafers are
8 moved relative to said work space;

9 a docking station which is controllable to open and close the
10 interface port, said docking station having features for receiving a wafer
11 container in position for moving wafers between the wafer container and
12 work space;

13 a plurality of processing stations; said processing stations having
14 access openings which open to the work space to allow installation and
15 removal of wafers relative to said processing stations;

16 a conveyor for conveying wafers to and from said plurality of
17 processing stations.]

18 CANCELLED 2. [A semiconductor processor according to claim 1 and further
19 comprising a docking station relay for moving wafers between said
20 docking station and said work space.]

21 CANCELLED 3. [A semiconductor processor according to claim 2 wherein said
22 docking station relay is pivotable.]

4. A semiconductor processor according to claim 2 wherein said docking station loader is pivotable about a horizontal axis.

CANCELLED 5. A semiconductor processor according to claim 1 wherein said docking station forms an air lock when a wafer container is in an engaged position therewith.

6. A semiconductor processor according to claim 1 and further comprising a wafer transfer for transferring wafers from a wafer carrier to a wafer tray.

CANCELLED 7. A semiconductor processor according to claim 6 and further comprising at least one wafer tray which holds wafers in exposed positions for processing fluid access to the surfaces of the wafers.

CANCELLED 8. A semiconductor processor according to claim 6 wherein said wafer transfer includes a first carriage which is movable.

CANCELLED 9. A semiconductor processor according to claim 6 wherein said wafer transfer includes a first carriage which is movable; said first carriage having a transfer opening through which a wafer tray is elevated to remove wafers from the wafer carrier.

CANCELLED

10. [A semiconductor processor according to claim 6 wherein said
2 wafer transfer includes a transfer elevator.]

CANCELLED

11. [A semiconductor processor according to claim 6 wherein said
5 wafer transfer includes:

6 a first carriage which is movable; said first carriage having a
7 transfer opening through which a wafer tray is elevated to remove
8 wafers from the wafer carrier;

9 a transfer elevator.]

CANCELLED

12. [A semiconductor processor according to claim 6 and further
12 comprising a loaded tray holding station for holding wafer trays which
13 are loaded with wafers.]

CANCELLED

15 13. [A semiconductor processor according to claim 6 and further
16 comprising a movable first carriage and a movable second carriage.]

17

18

19

20

21

22

23

24

1 CANCELLED 14. [A semiconductor processor according to claim 6 and further
2 comprising:

3 a movable first carriage; said first carriage forming part of said
4 interface; said first carriage having a transfer opening through which a
5 wafer tray is elevated to remove wafers from the wafer carrier;

6 a movable second carriage; said second carriage having a loaded
7 tray holding station for holding wafer trays which are loaded with
8 wafers;

9 a transfer elevator for moving the wafer tray through the transfer
10 opening and wafer carrier to transfer wafers onto the wafer tray.]

11
12 CANCELLED 15. [A semiconductor processor according to claim 6 and further
13 comprising:

14 a movable first carriage; said first carriage forming part of said
15 interface; said first carriage having a transfer opening through which a
16 wafer tray is elevated to remove wafers from the wafer carrier; said
17 first carriage further having an empty tray pass-through opening through
18 which an empty wafer tray is lowered by said elevator;

19 a movable second carriage; said second carriage having a loaded
20 tray holding station for holding wafer trays which are loaded with
21 wafers;

22 a transfer elevator for moving the wafer tray through the transfer
23 opening and wafer carrier to transfer wafers onto the wafer tray]

24

~~CANCELLED~~ 16. [A semiconductor processor according to claim 6 and further comprising:

a movable first carriage; said first carriage forming part of said interface;

a transfer opening through said first carriage and through which a wafer tray is elevated to remove wafers from the wafer carrier;

an empty tray pass-through opening in said first carriage through which an empty wafer tray is lowered by said elevator;

empty wafer tray storage for holding empty wafer trays;

a movable second carriage; said second carriage having a loaded tray holding station for holding wafer trays which are loaded with wafers;

a transfer elevator for moving the wafer tray through the transfer opening and wafer carrier to transfer wafers onto the wafer tray.]

~~CANCELLED~~ 17. [A semiconductor processor according to claim 6 and further comprising a transfer elevator having an enlarged elevator head and a relatively narrow elevator stem.]

~~CANCELLED~~ 18. [A semiconductor processor according to claim 1 wherein said conveyor includes a mechanical arm assembly with a hand portion that engages a wafer tray.]

1 CANCELLED 9. [A semiconductor processor according to claim 1 wherein said
2 conveyor includes a mechanical arm assembly; said mechanical arm
3 assembly having:
4 an upper arm portion;
5 a lower arm portion connected to the upper arm portion;
6 a hand portion connected to the lower arm portion, said hand
7 portion serving to engage a wafer tray.]

8
9 CANCELLED 20. [A semiconductor processor according to claim 1 wherein said
10 conveyor includes a conveyor tram carriage movably mounted upon the
11 frame.]

12
13 CANCELLED 21. [A semiconductor processor according to claim 1 wherein said
14 conveyor includes a mechanical arm assembly; said mechanical arm
15 assembly having:
16 a conveyor tram carriage movably mounted upon the frame;
17 an upper arm portion mounted upon said conveyor tram carriage
18 for pivotal motion at a shoulder pivot;
19 a lower arm portion connected to the upper arm portion for
20 pivotal motion at an elbow pivot;

21 a hand portion connected to the lower arm portion for pivotal
22 motion at a wrist pivot;
23 a wafer tray engagement tool connected to the hand portion.]

CANCELLED 22. [A semiconductor processor according to claim 1 wherein said plurality of processing stations includes at least one centrifugal processing station.]

CANCELLED 23. [A semiconductor processor according to claim 1 wherein said plurality of processing stations includes at least one centrifugal processing station having an access opening with a processing closure mounted to controllably open and close the access opening.]

CANCELLED 24. [A semiconductor processor according to claim 1 wherein said plurality of processing stations includes at least one processing station having an access opening with a processing closure mounted for controlled upward and downward action; said processing closure serving to controllably close and open the access opening.]

CANCELLED 25. [A semiconductor processor according to claim 1 wherein said plurality of processing stations includes at least one centrifugal processing station having an access opening with a processing closure mounted for controlled upward and downward action; said processing closure serving to controllably close and open the access opening.]

21
22
23
24

CANCELLED 26. [A wafer handling apparatus for moving wafers to or from
an enclosed wafer container, comprising:

an enclosure for providing a substantially enclosed work space;

an interface port in said enclosure through which wafers are
moved relative to said work space;

a docking station which is controllable to open and close the
interface port, said docking station having features for receiving said
wafer container in position for moving wafers between the wafer
container and work space;

a docking station relay for moving wafers between said docking
station and said work space.]

CANCELLED 27. [A semiconductor processor according to claim 26 wherein
said docking station relay is pivotable]

CANCELLED 28. [A semiconductor processor according to claim 26 wherein
said docking station loader is pivotable about a horizontal axis.]

CANCELLED 29. [A semiconductor processor according to claim 26 wherein
said docking station forms an air lock when a wafer container is in an
engaged position therewith.]

~~CANCELLED~~ 30. [A semiconductor processor according to claim 26 and further comprising at least one inventory for holding wafers in position for movement by said docking station relay.]

~~CANCELLED~~ 31. [A semiconductor processor according to claim 26 and further comprising a wafer transfer for transferring wafers from a wafer carrier to a wafer tray.]

~~CANCELLED~~ 32. [A semiconductor processor according to claim 31 wherein said wafer transfer includes a first carriage which is movable.]

~~CANCELLED~~ 33. [A semiconductor processor according to claim 31 wherein said wafer transfer includes a first carriage which is movable; said first carriage having a transfer opening through which a wafer tray is elevated to remove wafers from the wafer carrier.]

~~CANCELLED~~ 34. [A semiconductor processor according to claim 31 wherein said wafer transfer includes a transfer elevator.]

19

20

21

22

23

24

~~CANCELLED~~ 35. [A semiconductor processor according to claim 31 wherein
2 said wafer transfer includes:

3 a first carriage which is movable; said first carriage having a
4 transfer opening through which a wafer tray is elevated to remove
5 wafers from the wafer carrier;

6 a transfer elevator.]

~~CANCELLED~~ 36. [A semiconductor processor according to claim 31 and further
8 comprising a loaded tray holding station for holding wafer trays which
9 are loaded with wafers.]

~~CANCELLED~~ 37. [A semiconductor processor according to claim 31 and further
12 comprising a movable first carriage and a movable second carriage.]

~~CANCELLED~~ 38. [A semiconductor processor according to claim 31 and further
16 comprising:

17 a movable first carriage; said first carriage forming part of said
18 interface; said first carriage having a transfer opening through which a
19 wafer tray is elevated to remove wafers from the wafer carrier;

20 a movable second carriage; said second carriage having a loaded
21 tray holding station for holding wafer trays which are loaded with
22 wafers;

23 a transfer elevator for moving the wafer tray through the transfer
24 opening and wafer carrier to transfer wafers onto the wafer tray.]

1 CANCELLED 39. [A semiconductor processor according to claim 31 and further
2 comprising:

3 a movable first carriage; said first carriage forming part of said
4 interface; said first carriage having a transfer opening through which a
5 wafer tray is elevated to remove wafers from the wafer carrier; said
6 first carriage further having an empty tray pass-through opening through
7 which an empty wafer tray is lowered by said elevator;

8 a movable second carriage; said second carriage having a loaded
9 tray holding station for holding wafer trays which are loaded with
10 wafers;

11 a transfer elevator for moving the wafer tray through the transfer
12 opening and wafer carrier to transfer wafers onto the wafer tray.]

13
14 CANCELLED 40. [A wafer handling interface according to claim 26 wherein
15 said transfer elevator has an enlarged elevator head and a relatively
16 narrow elevator stem.]

17

18

19

20

21

22

23

24

~~CANCELLED~~

- 1 A method for processing wafers and similar semiconductor
2 articles using an automated semiconductor processing system, comprising:
3 providing a substantially enclosed working space within a
4 processing system enclosure forming a part of said semiconductor
5 processing system;
6 engaging a sealed wafer container with a docking station forming
7 a part of said semiconductor processing system;
8 opening the sealed wafer container; said opening occurring with
9 the sealed wafer container in fluid communication with a contained area
10 forming part of the wafer processing system;
11 opening an interface port forming a part of said docking station,
12 through which wafers can be moved between the decking station and
13 the enclosed work space;
14 moving wafers between the sealed wafer container and the
15 enclosed work space;
16 relaying the wafers from the docking station to a transfer
17 apparatus within the semiconductor processing system;
18 transferring wafers from a wafer carrier to a wafer tray suitable
19 for subsequent processing;
20 processing wafers held upon a wafer tray through multiple
21 processing stations.

1 42. [A method for processing wafers according to claim 41
2 wherein said transferring wafers includes:

3 positioning the wafer carrier containing the wafers;

4 extending the wafer tray through the wafer carrier;

5 shifting wafers from the wafer carrier onto the wafer tray.]

7 CANCELLED 43. [A method for processing wafers according to claim 51
8 wherein said transferring wafers includes:

9 positioning the wafer carrier containing the wafers;

10 extending the wafer tray up through the wafer carrier;

11 lifting wafers from the wafer carrier onto the wafer tray.]

12 CANCELLED 44. [A method for processing wafers according to claim 41 and
13 further comprising placing a loaded wafer tray at a loaded tray holding
14 station.]

17 CANCELLED 45. [A method for processing wafers according to claim 41 and
18 further comprising storing unloaded wafer trays within the enclosed work
19 space for use in said transferring wafers.]

21 CANCELLED 46. [A method for processing wafers according to claim 41 and
22 further comprising moving a first carriage from a carrier load position
23 to a transfer position.]

CANCELLED 47. A method for processing wafers according to claim 41 and further comprising:

storing unloaded wafer trays upon a first carriage for use in said transferring wafers;

moving the first carriage from a carrier load position to a tray pick position;

elevating a stored unloaded wafer tray from the first carriage;

moving the first carriage from the tray pick position to a transfer position wherein said first carriage is ready for said transferring.

CANCELLED 48. A method for processing wafers according to claim 41 and further comprising:

storing unloaded wafer trays upon a first carriage for use in said transferring wafers;

moving the first carriage from a carrier load position to a tray pick position;

elevating a stored unloaded wafer tray from the first carriage onto an elevator;

moving the first carriage from the tray pick position to a pass-through position;

lowering a wafer tray on said elevator through a pass-through opening in the first carriage;

moving the first carriage from the pass-through position to a transfer position wherein said first carriage is ready for said transferring.

CANCELLED 49. A method for processing wafers according to claim 41 and
further comprising:

after said transferring wafers, moving a second carriage to an extended tray load position;

placing the loaded wafer tray at a loaded tray holding station upon said second carriage.

□ ३४ श्री परमहंस योगी

1 CANCELLED. A method for processing wafers according to claim 41 and
2 further comprising:
3 storing unloaded wafer trays upon a first carriage for use in said
4 transferring wafers;
5 moving the first carriage from a carrier load position to a tray
6 pick position;
7 elevating a stored unloaded wafer tray from the first carriage onto
8 an elevator;
9 moving the first carriage from the tray pick position to a pass-
10 through position;
11 lowering a wafer tray on said elevator through a pass-through
12 opening in the first carriage;
13 moving the first carriage from the pass-through position to a
14 transfer position wherein said first carriage is ready for said transferring;
15 after said transferring wafers, moving a second carriage to an
16 extended tray load position;
17 placing the loaded wafer tray at a loaded tray holding station
18 upon said second carriage.

19

20

21

22

23

24

51. A method for processing wafers and similar semiconductor articles using an automated semiconductor processing system, comprising:

providing a substantially enclosed working space within a processing system enclosure forming a part of said semiconductor processing system;

engaging a sealed wafer container with a docking station forming a part of said semiconductor processing system;

opening the sealed wafer container; said opening occurring with the sealed wafer container in fluid communication with a contained area forming part of the wafer processing system;

opening an interface port forming a part of said docking station, through which wafers can be moved between the docking station and the enclosed work space;

moving wafers between the sealed wafer container and the enclosed work space;

relaying the wafers from the docking station to another position within the processing enclosure.

52. A method for processing wafers according to claim 51 wherein said relaying includes pivoting the wafers from the docking station.

1 53. [A method for processing wafers according to claim 51
2 wherein said relaying includes pivoting the wafers from the docking
3 station about a horizontal pivot axis.]

4
5 54. [A method for processing wafers according to claim 51
6 wherein said relaying includes pivoting the wafers from the docking
7 station and resting the wafers upon a movable carriage.]

8
9 55. [A method for processing wafers according to claim 51
10 wherein said relaying includes pivoting the wafers from the docking
11 station and resting the wafers upon a movable carriage in an orientation
12 displaced approximately 90°.]

13 ADD CLAIMS 56-63

14 Please add new claims 64-68

15 Please add new claim 69-73

16 Please add new claims 74-79.

17 Add B37

18 Add B37

19

20

21

22

23

24